

WHAT IS CLAIMED IS:

1. An audio system that reproduces contents information as sound in a vehicle, comprising:
  - a portable audio apparatus carried by a passenger 5 of said vehicle; and
  - an audio apparatus mounted in said vehicle, wherein said portable audio apparatus comprise:
    - a storage medium for retaining contents information; and
- 10 a transmission module for transmitting said contents information to said audio apparatus at least by means of radio communication,
  - wherein said audio apparatus comprises:
    - a reception module for receiving said contents 15 information from said portable audio apparatus at least by means of radio communication; and
    - a control unit for reproducing said contents information received by said reception module and outputting the reproduced information as sound from a 20 speaker mounted in said vehicle.
2. The audio system according to claim 1, wherein said audio apparatus further comprises:
  - an operation switch that allows the passenger of said vehicle to input an operation of said audio 25 system; and
  - an operation signal transmission module for transmitting an operation signal corresponding to the

operation of said operation switch to said portable audio apparatus at least by means of radio communication,

wherein said portable audio apparatus further 5 comprises a CPU for controlling the own operation according to said operation signal received from said audio apparatus at least by means of radio communication.

3. The audio system according to claim 1, wherein at 10 least any one of said audio apparatus and said portable audio apparatus further comprises a man-machine interface capable of selecting a communication execution state in which contents information is transmitted between both apparatuses or a non- 15 communication execution state in which contents information is not transmitted.

4. The audio system according to claim 1, wherein at least said audio apparatus further comprises a display for visibly displaying the state of communication 20 between said audio apparatus and said portable audio apparatus.

5. The audio system according to claim 1, wherein said audio apparatus identifies said portable audio apparatus that exists in a predetermined radio 25 communication area of said audio apparatus and further comprises a system construction unit for constructing a

radio communication system made up of the identified portable audio apparatus and said audio apparatus, and said audio apparatus acquires said contents information from the portable audio apparatus

5 identified by said system construction unit.

6. The audio system according to claim 5, wherein said audio apparatus further comprises a man-machine interface capable of, when a plurality of contents information pieces is received from a plurality of 10 portable audio apparatuses identified by said system construction unit, instructing simultaneous reproduction of the plurality of contents information pieces,

wherein said control unit, when simultaneous reproduction is instructed by said man-machine interface, outputs at least one contents information piece from among the plurality of contents information pieces whose simultaneous reproduction is instructed from said speaker and at the same time remotely 20 controls said plurality of portable audio apparatuses so that the other contents information pieces are reproduced by at least any one of the plurality of portable audio apparatuses identified by said system construction unit.

25 7. The audio system according to claim 5, wherein said reception module can receive contents information

from the plurality of portable audio apparatuses identified by said system construction unit,

    said audio apparatus further comprises a man-machine interface capable of, when a plurality of contents information pieces is received from the plurality of portable audio apparatuses identified by said system construction unit, setting priority of the plurality of portable audio apparatuses in order to set the order of reproducing those contents information

10 pieces, and

    said control unit, when the priority is set by said man-machine interface, sequentially performs control that contents information received from one portable audio apparatus is output as sound from the speaker mounted in said vehicle on said identified plurality of portable audio apparatuses according to said priority.

8. The audio system according to claim 5, wherein said system construction unit, for the purpose of identifying said portable audio apparatuses detected in said vehicle, which is said predetermined radio communication area, assigns individual identification addresses and constructs said radio communication system with all portable audio apparatuses, which have been assigned identification addresses, and said audio apparatus.

9. The audio system according to claim 5, wherein  
said system construction unit transmits a first radio  
signal with directivity in said vehicle and identifies  
said portable audio apparatus that exists in said  
5 predetermined radio communication area based on a  
second radio signal received from said portable audio  
apparatus according to the transmission of the radio  
signal.

10. The audio system according to claim 9, wherein  
10 said predetermined radio communication area corresponds  
to a seat position placed in said vehicle.

11. The audio system according to claim 10, wherein  
said predetermined radio communication area corresponds  
to a position of the mount of said portable audio  
15 apparatus placed in said vehicle.

12. The audio system according to claim 9, wherein  
said system construction unit sends a first radio  
signal from a radio antenna installed almost in the  
center of said vehicle.

20 13. A contents reproduction method of an audio system  
that reproduces contents information as sound in a  
vehicle, comprising:

25 a system constructing step of constructing a  
communication system constructed of a portable audio  
apparatus carried by a passenger of said vehicle and an  
audio apparatus mounted in said vehicle that performs  
at least radio communication;

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      a contents information transmitting step of  
      transmitting contents information pre-stored in said  
      portable audio apparatus to said audio apparatus at  
      least by means of radio communication; and

5       a sound reproducing step of receiving and  
      reproducing said contents information sent in said  
      contents information transmitting step by said audio  
      apparatus at least by means of radio communication and  
      outputting the reproduced information as sound from a  
10      speaker mounted in said vehicle.

14. The contents reproduction method according to  
      claim 13, further comprising:

      an operation inputting step allowing the passenger  
      of said vehicle to input an operation of said audio  
15      system;

      an operation signal transmitting step of  
      transmitting an operation signal according to the  
      operation input in said operation inputting step to  
      said portable audio apparatus at least by means of  
20      radio communication; and

      a reproducing step in which said portable audio  
      apparatus reproduces contents information retained in  
      the portable audio apparatus in response to said  
      operation signal received from said audio apparatus at  
25      least by means of radio communication.

15. The contents reproduction method according to  
      claim 13, wherein said radio communication system is

constructed in said system constructing step only at the beginning of audio control.

16. The contents reproduction method according to claim 13, wherein said radio communication system is  
5 constructed in said system constructing step at predetermined time intervals.

17. The contents reproduction method according to claim 13, wherein in order to identify said portable audio apparatus detected in said vehicle as a  
10 predetermined radio communication area, said system constructing step assigns individual identification addresses and constructs said radio communication system with all portable audio apparatuses with the identification addresses assigned and said audio  
15 apparatus.

18. An audio apparatus for a vehicle mounted in a vehicle that reproduces contents information as sound in said vehicle, comprising:

20 a system construction unit for constructing a radio communication system constructed of a portable audio apparatus carried by a passenger of the vehicle and said audio apparatus;

25 a reception module for receiving said contents information from said portable audio apparatus at least by means of radio communication; and

a control unit for reproducing said contents information received by said reception module and

outputting the reproduced information as sound from a speaker mounted in said vehicle.

19. The audio apparatus for a vehicle according to claim 18, wherein said system construction unit constructs, when a plurality of said portable audio apparatuses is identified, a radio communication system including the plurality of portable audio apparatuses, and

10        said control unit, between said plurality of portable audio apparatuses, transfers contents information retained in a first portable audio apparatus to a second portable audio apparatus via radio communication and controls so that the contents information is reproduced as sound in said second 15      portable audio apparatus.

20. A contents reproduction method of an audio apparatus for a vehicle mounted in said vehicle to reproduce contents information as sound in said vehicle, comprising:

20        a system constructing step of constructing a radio communication system constructed of a portable audio apparatus carried by a passenger of said vehicle and said audio apparatus;

25        a receiving step of receiving said contents information from said portable audio apparatus at least by means of radio communication; and

100-13700-27745-0

    a sound reproducing step of reproducing said contents information received in said receiving step and outputting the reproduced information as sound from a speaker mounted in said vehicle.

5   21. The contents reproduction method according to claim 20, wherein, when a plurality of said portable audio apparatuses is identified in said system constructing step, a radio communication system including the plurality of portable audio apparatuses

10   is constructed, and

    said sound reproducing step, between said plurality of portable audio apparatuses, transfers contents information retained in a first portable audio apparatus to a second portable audio apparatus via

15   radio communication and controls so that the contents information is reproduced as sound in said second portable audio apparatus.

22. An audio apparatus for a vehicle that reproduces contents information as sound in a vehicle comprising:

20   an audio control unit equipped with a first radio communication apparatus; and

    a plurality of speaker units equipped with a second radio communication apparatus,

25   wherein said first and second radio communication apparatuses can carry out radio communications based on a predetermined radio communication protocol, and

5        said plurality of speaker units receives a radio signal sent from the first radio communication apparatus of said audio control unit by said second radio communication apparatus and reproduces contents information included in the received radio signal according to characteristic information individually set for each speaker unit.

23. The audio apparatus for a vehicle according to claim 22, wherein said audio control unit can perform a setting by which said plurality of speaker units is divided into a plurality of groups made up of at least one speaker unit and sends a radio signal including contents information differing among the set plurality of groups.

15 24. The audio apparatus for a vehicle according to claim 23, wherein said plurality of speaker units is provided in accordance with the seats in the vehicle, and

20        said audio control unit sends to a speaker unit corresponding to a specific seat, a radio signal including contents information different from the contents information of the other speaker units.

25 25. The audio apparatus for a vehicle according to claim 22, wherein said audio control unit sends a first radio signal including the same contents information to said plurality of speaker units and sends a second

radio signal including said characteristic information to each speaker unit individually, and

    said plurality of speaker units applies sound field processing based on individual characteristic

5    information included in said second radio signal to the contents information included in said first radio signal and then outputs the contents information as sound.

26. The audio apparatus for a vehicle according to

10    claim 25, wherein said characteristic information includes information on the locations of all said plurality of speaker units and sound field processing at those locations, and

    said plurality of speaker units performs sound field processing taking into account the other units based on said characteristic information prior to outputting sound from the own unit.

27. The audio apparatus for a vehicle according to

claim 22, wherein said plurality of speaker units is provided in accordance with the seats in said vehicle, and

    said audio control unit controls a speaker unit from among said plurality of speaker units that corresponds to a specific seat so as to be able to reproduce sound with sound volume, sound quality or sound field different from the other speaker units.

28. The audio apparatus for a vehicle according to  
claim 27, wherein the seats in said vehicle are  
provided with a detection unit for detecting whether  
any child seat is attached, and

5           said audio control unit designates a seat where  
said detection unit has detected the presence of a  
child seat as said specific seat and controls the  
speaker unit corresponding to the seat so as to be able  
to reproduce sound with sound volume, sound quality or  
10 sound field different from the other speaker units.

29. The audio apparatus for a vehicle according to  
claim 22, wherein said audio control unit is a portable  
terminal.

30. The audio apparatus for a vehicle according to  
15 claim 22, wherein said audio control unit sends, when  
said radio signal is sent, contents information to be  
sent through the radio signal by dividing the contents  
information by a predetermined unit amount of  
information to said plurality of speaker units.

20 31. The audio apparatus for a vehicle according to  
claim 30, wherein when the contents information divided  
into said predetermined unit amounts of information  
received through said radio signal is reproduced, said  
plurality of speaker units synchronizes the output  
25 timing among one another.

32. The audio apparatus for a vehicle according to  
claim 22, wherein when a plurality of types of radio

signals sent from different sources is received, said plurality of speaker units reproduces contents information included in any one of the radio signals based on preset priority.

5 33. A portable audio apparatus in the vehicle audio system according to claim 22 that comprises a third radio communication apparatus that receives a radio signal sent from the first radio communication apparatus of said audio control unit and can reproduce  
10 sound at least through a headphone based on the radio signal received by the radio communication apparatus.

34. A contents reproduction method for an audio apparatus for a vehicle that reproduces contents information as sound in a vehicle, comprising:

15 a system constructing step of constructing a radio communication system made up of an audio control unit and a plurality of speaker units each equipped with a radio communication apparatus that can carry out radio communication based on a predetermined radio  
20 communication protocol;

a first step of sending a radio signal including contents information from said audio control unit; and

a second step of receiving said radio signal from said plurality of speaker units and reproducing the  
25 contents information included in the received radio signal as sound according to the characteristic information individually set for each speaker unit.

35. The contents reproduction method according to  
claim 34, wherein said first step divides said  
plurality of speaker units into a plurality of groups  
made up of at least one speaker unit and sends a radio  
5 signal including contents information differing among  
those groups from said audio control unit.

36. The contents reproduction method according to  
claim 34, wherein in said first step, said audio  
control unit sends a first radio signal including the  
10 same contents information to said plurality of speaker  
units and sends a second radio signal including said  
characteristic information to each of the speaker units,  
and

15 in said second step, said plurality of speaker  
units applies sound field processing based on the  
individual characteristic information included in said  
second radio signal to the contents information  
included in said first radio signal individually and  
then outputs the contents information as sound.

20 37. The contents reproduction method according to  
claim 34, wherein said plurality of speaker units are  
preset in accordance with the seats in the vehicle, and  
said second step controls a speaker unit from  
among said plurality of speaker units that corresponds  
25 to a specific seat by said audio control unit so as to  
be able to reproduce sound with sound volume, sound

quality or sound field different from the other speaker units.

38. The contents reproduction method according to claim 34, wherein when said radio signal is sent from said audio control unit in said first step, the contents information to be sent through the radio signal is divided by a predetermined unit amount of information and sent to said plurality of speaker units.

39. The contents reproduction method according to claim 34, wherein when said plurality of speaker units receives a plurality of types of radio signals sent from different sources in said second step, contents information included in any one of the radio signals is reproduced based on preset priority.

40. An audio system that reproduces contents information as sound in a vehicle, comprising:

    a portable audio apparatus carried by a passenger of said vehicle; and

    an audio apparatus mounted in said vehicle,

20     wherein said portable audio apparatus comprises:

    contents information retaining means for retaining contents information; and

    transmitting means for transmitting said contents information to said audio apparatus at least by means

25     of radio communication, and

    wherein said audio apparatus comprises:

receiving means for receiving said contents information from said portable audio apparatus at least by means of radio communication; and

controlling means for reproducing said contents

5 information received by said receiving means and outputting the reproduced information as sound from a speaker mounted in said vehicle.

41. An audio apparatus for a vehicle mounted in a vehicle that reproduces contents information as sound

10 in said vehicle, comprising:

system constructing means for constructing a radio communication system constructed of a portable audio apparatus carried by a passenger of the vehicle and said audio apparatus;

15 receiving means for receiving said contents information from said portable audio apparatus at least by means of radio communication; and

controlling means for reproducing said contents information received by said receiving means and

20 outputting the reproduced information as sound from a speaker mounted in said vehicle.

42. An audio apparatus for a vehicle that reproduces contents information as sound in a vehicle, comprising:

25 audio controlling means equipped with a first radio communication apparatus and a plurality of speaker units equipped with a second radio communication apparatus,

wherein said first and second radio communication apparatuses can carry out radio communications based on a predetermined radio communication protocol, and

    said plurality of speaker units receives a radio

5   signal sent from the first radio communication apparatus of said audio controlling means by said second radio communication apparatus and reproduces contents information included in the received radio signal according to characteristic information

10   individually set for each speaker unit.

43. A computer program product that provides instructions that implement an operation of the audio apparatus for a vehicle according to claim 18.

44. A computer program product that provides

15   instructions that implement an operation of the audio apparatus for a vehicle according to claim 41.

45. A computer program product that provides instructions that implement the contents reproduction method according to claim 20 with an audio apparatus

20   for a vehicle.

46. A computer-readable storage medium that stores a program code that implements an operation of the audio apparatus for a vehicle according to claim 18.

47. A computer-readable storage medium that stores a

25   program code that implements an operation of the audio apparatus for a vehicle according to claim 41.

48. A computer-readable storage medium that stores a program code that implements the contents reproduction method according to claim 20 with an audio apparatus for a vehicle.